ON THE EMISSION OF EXO ELECTRONS IN A GEIGER COUNTER

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During the course of a study of the mechanism of Geiger counter discharge with reversed potentials it was observed that the number of cosmic ray background pulses increased substantially when the normal potential distribution was restored after operating the counter in the reversed direction for a few minutes. A closer inspection of the phenomenon soon revealed that this increase in the number of background pulses rapidly falls with time as shown in Fig. 1 which depicts a measurement of the time variation of the number of pulses. It is also evident that at a given moment the numher of pulses per minute N and the time T are inversely proportional, satisfying an empirical relation of the type $N \times T =$ constant. This fact is more clearly demonstrated by plotting the product of the number of pulses per minute N and time T which are shown as small circles in middle of Fig. 1.

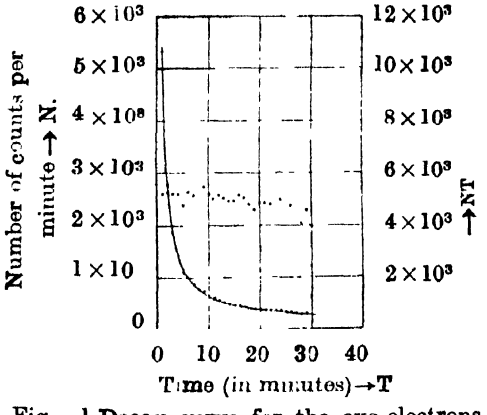

Fig. 1.Decay curve for the exo-electrons.

The observed increase in the number of pulses may be attributed to a copious emission of exo-electrons from the cylinder. This emission becomes more pronounced when the cylinder is made of colloidal graphite. a well-known semiconductor.

In a counter operating with reversed potentials, the electrons are collected by the positive cylinder. Some of these electrons are trapped by the lattice defects in the metallic cylinder which are released subsequently as exo-electrons when negative potential is restored to the cylinder. Indeed, such an emission of exo-

electrons was reported by Haxel *et al.* (1951) where the electrons trapped in lattice defects created by mechanical abrasion, were subsequently released as exo-electrons by heat treatment. Seeger (1955) also detected the emission of exo-electrons in cases where the crystal defects were created by chemical oxidation process and the after-emission was provoked by means of electron bombardment of energy of about 1000 ev. It is interesting to note that in the present study the curve shown in Fig. 1 closely resembles the time variation curve for exo-electrons obtained by Haxel *et al*, (1951).

REFERENCES

Haxel, O., Houtermans, F. G. and Seeger, K., 1851, *Zeit. f. Phys.* **130**, 122.
Seeger, K., 1955, *Naturwiss*, **42**, 66.

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CERTAIN THERMISTOR CHARACTERISTICS OF SINGLE CRYSTALS OF TUNGATENITE (WS_2)

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In order to further investigate the self heated thermistor property of naturally occurring tungstenite (WS_2) crystals (already reported, Guha Thakurta, 1967), its steady state current-voltage characteristics have been studied at different temperatures and pressures and for currents along both the crystallographic directions. Further, investigation has also been made under transient conditions wherein the rise of temperature with time is recorded after the sample is suddenly introduced in a high temperature enclosure. Results of these observations are graphically represented in figures 1, 2 and 3. It is to be noted here that as the behaviours are similar in both the principal directions, results of measurements in one direction only are given in the diagrams.

It is observed from figures 1 and 2, that the voltage always attains a maximum value say V_m, for a particular value of current and at a particular ambient temperature and pressure and then begins to decrease with further increase of current. This V_m together with I_m, W_m, and T_m the corresponding current, wattage absorbed by the sample and the temperature of the sample respectively are evidently important quantities in deciding the peculiarities of a particular thermistor, have been obtained from a study of fig. 1, and the values for the particular sample